

31

Date: Tuesday, 6/26/2007 3:08:29 PM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : OH-58 FWD X-TUBE ASSEMBLY - UNDER REVIEW
 Job Number : 33146
 Estimate Number : 12526
 P.O. Number : N/A Part Number : D058676101
 This Issue : 6/26/2007 S.O. No. : N/A Drawing Number : D058-676-141 REV A2
 Prsht Rev. : NC Project Number : N/A
 First Issue : N/A Type : LANDING GEAR Drawing Revision : A2 UNDER REVIEW
 Previous Run : 30250 Material : N/A
 Due Date : 7/30/2007 Qty: 1 Um: Each
 Written By :
 Checked & Approved By :
 Comment : Est Rev: E 06.09.11 Reformat IEC

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC

DOCUMENT CONTROL



KS 07.07.26 (1)

Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D058-676-101CHG001

07/10/23

2.0

D6001105

Crosstube



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6001-105 Crosstube 25661

unable to enter BG 07.11.11 (1)

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs on both ends as per Folio FA085

2-Turn first side as per Folio FA085

3-Deburr & Inspect for surface damage.

BG 07.11.11 (1)

4.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BG 07.11.11 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA085

2-Deburr & Inspect for surface damage.

BC 07-11-12

①

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BC 07-11-12

①

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

BC 07-11-12

①

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Remove sand and plugs

2-Scribe part # and batch # using vibrating stylus as per Dwg D058-676-141
Inside of Cuff(Donot engrave on outside of tube)

BC 07-11-12

①

9.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

AWM 07-11-12

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 7-11-12

11.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

AWM 07-11-12

SR/EL 7-11-13

W/O:		WORK ORDER CHANGES					
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Job Number: 33146

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description:

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 7-11-13

13.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D058-676-141 using CNC bender program OH58-fw and Folio FT014

EL 7-11-13

14.0

QC6

DIMENSIONAL CHECK



Comment: Inspect dimensions and work To Current Step

JA 11-14 ①

15.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D058-676-141 using drill Jig DT8541 & DT8542

2-Ream hole to finish size in tube as per Dwg D058-676-141 using drill Jig DT8541 & DT8542. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D058-676-141

SR 7-11-14

JB 7-11-15

16.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4-1

JB 7-11-15

17.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

JA 11-15 ①

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

JA 11-15 ①

19.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 0380

Issue P/O: 5068 686 7/11/19 ①

LPI as per ASTM 1417 Level 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

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Job Number: 33146

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

Attach copy of NDT results to work order

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

2/14/16

21.0

QC6

DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D058-676-241

071119 ①

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ml 071119 ①
ml 071120 ①

23.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

071121 ①

24.0

D2856400

Abrasion Strip



Comment: Qty.: 0.5800 f(s)/Unit Total : 0.5800 f(s)

Pick:

Qty Part number Description Batch
2 D2856-400-694 Abrasion Strip *34642*

ml 071121

25.0

D28911

Support 2.25 dia



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch
2 D2891-1 Support *29108*

ml 071121

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Job Number: 33146

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

26.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number

Description Batch

4 MS21920-20

Clamp 102787

ml 07/11/21

27.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install abrasion strips as per QSI 035 using DT8579

2-Install supports and clamps as per Dwg D058-676-141. Torque clamps to 80-100 in lb.

ml 07/11/22

28.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

ml 07/11/22 (X)

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

30.0

AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 AN5-32A

Bolt

M104936

AS 07/11/22 (X)

31.0

AN960JD516

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

8 AN960JD516

Washer

M104156

AS 07/11/22 (X)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: RD Date: 07/11/26
 QA: N/C Closed: _____ Date: _____

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Job Number: 33146

Part Number: D058676101

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 MS21042L5

Nut (or -5)

M105430

AS 07/11/22

(X1)

33.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

AS 7/11/23 (X1)

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D058-676-101

Location:

B

AS

7/11/23

54

(X1)

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

AS 7/11/26 (X1)

Job Completion



6 07/11/26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	33146
Description: Crosstube Assembly (OH-58 High Fwd)		Part Number:	D058-676-141
Inspection Dwg: D058-676-141 Rev: A2		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	✓	2.241			
	2.069	+0.005/-0.000	✓	2.074			
	2.113	+0.005/-0.000	✓	2.118			
	2.158	+0.005/-0.000	✓	2.164			
	2.183	+0.005/-0.000	2.188	✓			
	2.209	+0.005/-0.000	2.213	✓			
	2.235	+0.005/-0.000	2.238	✓			
	0.100	+/-0.010	.100	✓			
	0.144 x 30°	+/-0.010	.144	✓			
	R0.063	+/-0.010	.063	✓			
	R0.500	+/-0.010	R.500	✓			
	4.207	+/-0.001	4.207	✓			
SIDE B	2.240	+0.005/-0.000	2.242	✓			
	2.069	+0.005/-0.000	2.073	✓			
	2.113	+0.005/-0.000	2.118	✓			
	2.158	+0.005/-0.000	2.162	✓			
	2.183	+0.005/-0.000	2.188	✓			
	2.209	+0.005/-0.000	2.213	✓			
	2.235	+0.005/-0.000	2.238	✓			
	0.100	+/-0.010	.100	✓			
	0.144 x 30°	+/-0.010	.144	✓			
	R0.063	+/-0.010	.063	✓			
	R0.500	+/-0.010	R.500	✓			
	4.207	+/-0.001	4.207	✓			
	103.03	+/-0.020	103.03	✓			

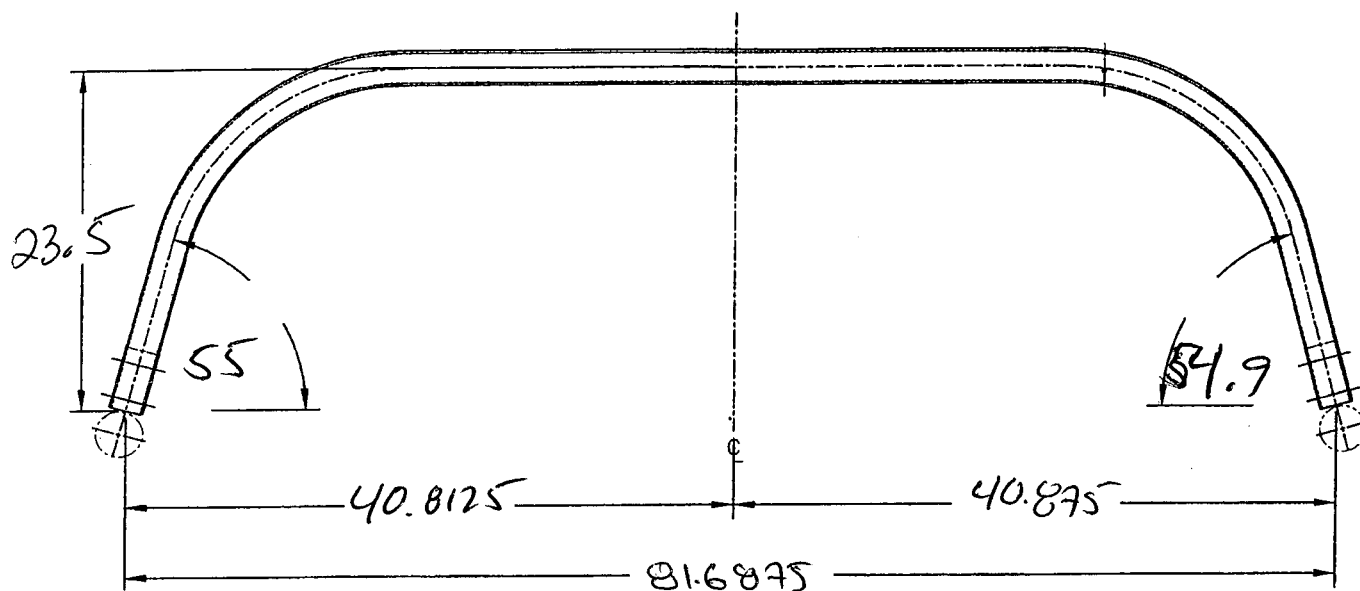
Measured by:	GR	Audited by:	JM	Prototype Approval:	N/A
Date:	07/11/12	Date:	07/11/12	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	07.03.26	New Issue (P/O D058-676-101)	KJ/JLM	JM

DART AEROSPACE LTD		Work Order:	33146
Description: Crosstube High Fwd (OH-58)		Part Number:	D058-676-101
Inspection Dwg: D058-676-141 Rev: A2		Page 1 of 1	

Rev 07.06.27

Required Dimension	Min	Max
Height	23.52	23.64
1/2 Span	40.86	40.98
Angle	54	56
Total Span	81.72	81.96



Comments

QC15 Inspection	ASIAL
Date	07-11-14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	<i>[Signature]</i>



DESIGN <i>CP</i>	DRAWN BY <i>CP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>#</i>	APPROVED <i>#</i>	DRAWING NO. D058-676-141	REV. A SHEET 1 OF 3
DATE 00.11.17		TITLE CROSSTUBE ASS'Y (OH-58 HIGH FWD) NTS	
A	00.11.17	NEW ISSUE	

Qty	Part Number	Description
X	D058-676-141	CROSSTUBE ASSEMBLY (OH-58 HIGH FWD)
1	D6001-105	CROSSTUBE
2	D2856-400-694	ABRASION STRIP
2	D2891-1	SUPPORT
4	MS21920-20	CLAMP

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6001-105
FINISHED LENGTH = 103.03±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-400-694 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2891-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) SEAL EDGES OF SUPPORTS AND ABRASION STRIP USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

PH 02.05.26
UNDER REVIEW
06.10.18 PH
Update New 0-0

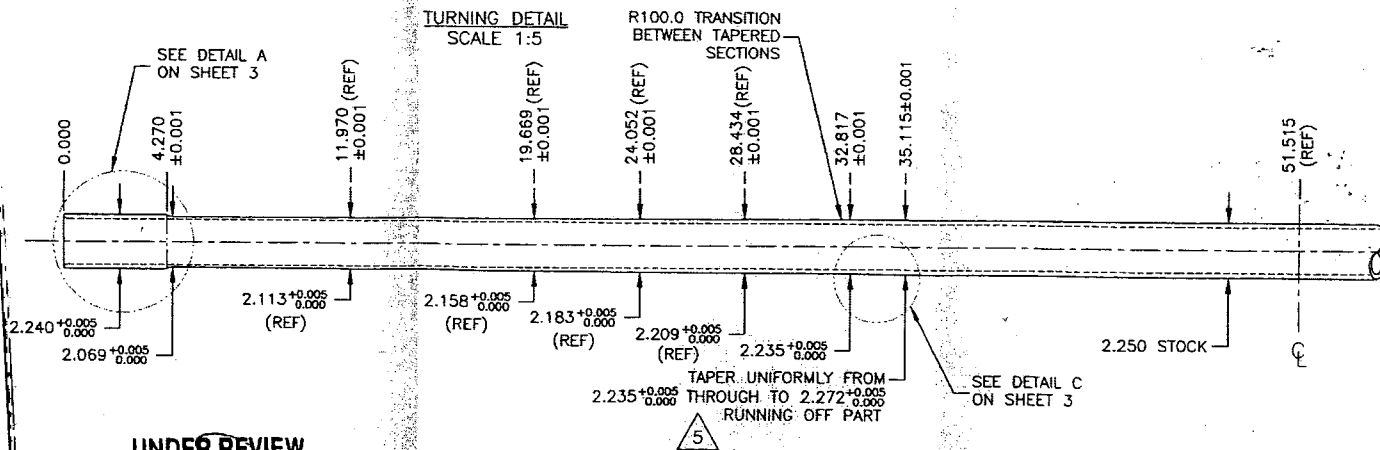
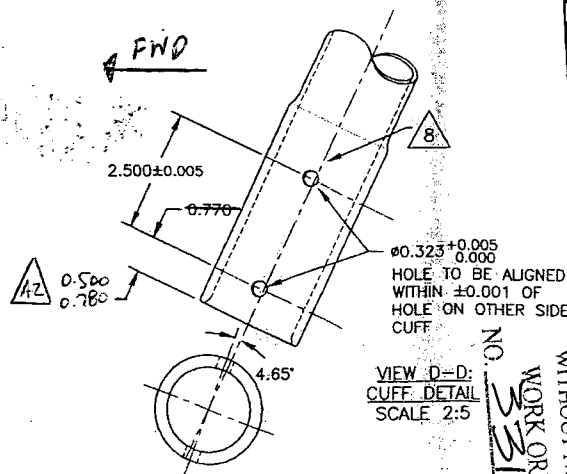
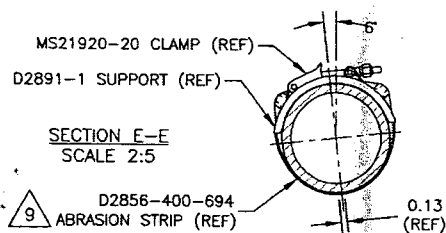
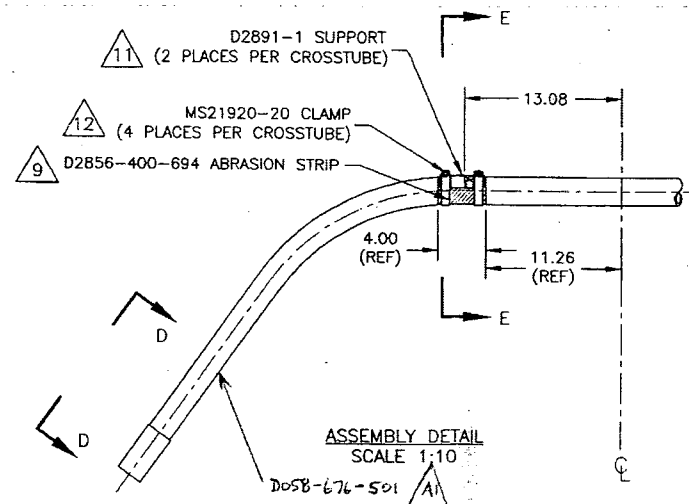
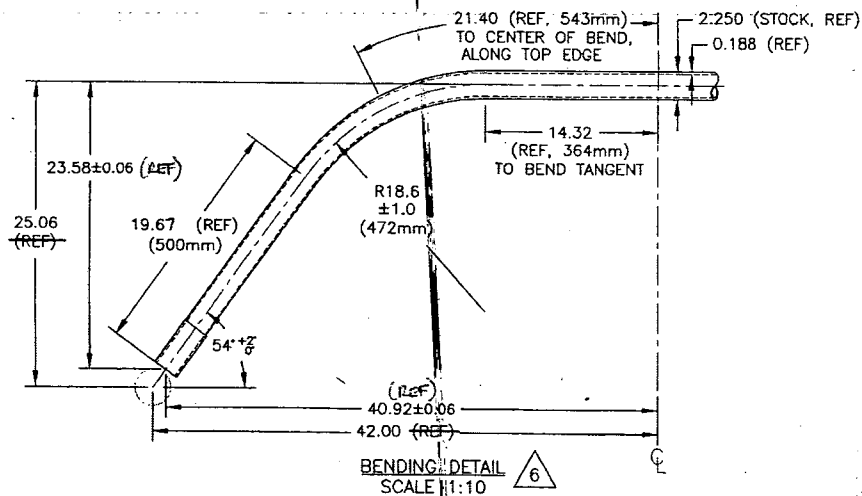
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RETURN TO
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WITHOUT NOTICE
WORK ORDER
NO. *33146*

RELEASED
00.11.24 #

AZ	01.07.16	UPDATE DIM TO FIRST HOLE	<i># CP</i>
A1	01.03.07	ADD D058-676-501 P/N	<i># CP</i>

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UNDER REVIEW

06.10.04 RH
Update View 0-0

RH
02.06.06

RELEASED
06.11.24

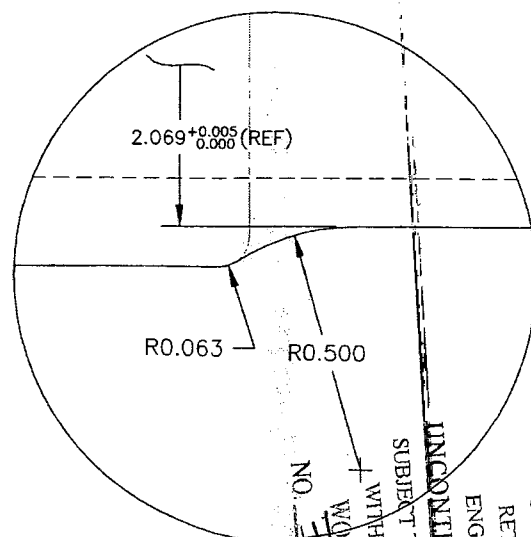
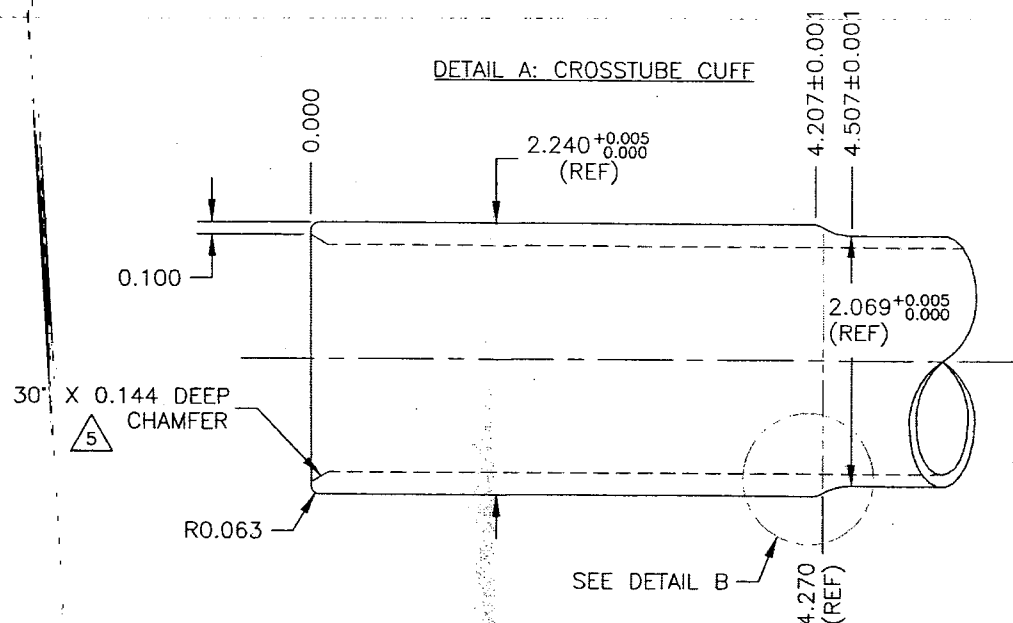
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	CHECKED	APPROVED	
	DATE	DRAWING NO.	REV. A
		TITLE	SHEET 2 OF 3

00.11.17	D058-676-141	SCALE
	CROSSTUBE ASSEMBLY (OH-S3 HIGH FWH)	1:10

NO. 33146
WORK ORDER
SUBJECT TO AMENDMENT
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SHOP COPY
02.06.06

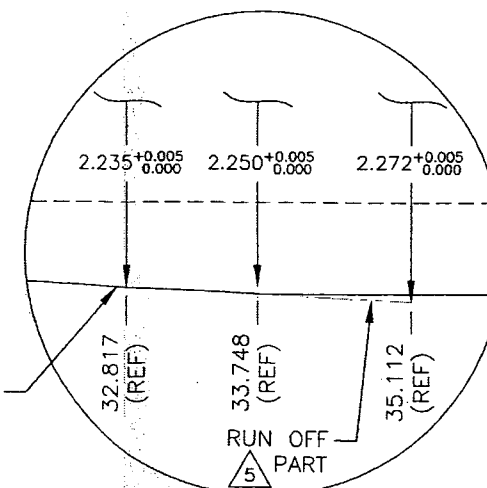
RELEASED
00.11.17

DETAIL A: CROSSTUBE CUFF



DETAIL B:
CUFF TRANSITION
SCALE 4:1

DETAIL C:
TAPER RUN-OFF
NOT TO SCALE



UNDER REVIEW

06.10.18 RH

Update view P-0

RH
02.06.06

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NO. 33146
WORK ORDER

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DATE 00.11.17		DRAWING NO. D058-676-141		REV. A SHEET 3 OF 3	
TITLE CROSSTUBE ASSEMBLY (CR-SS HIGH FWD)		SCALE 1:1			



LIQUID PENETRANT TEST REPORT

P - 1200 1

CLIENT	DART AEROSPACE	DATE	NOV 16 2007	PAGE	1	OF	2
ATTENTION	LINDA LACELLE	ACUREN JOB NO.	188 07 1200	TIME	AM <input type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	1270 ABERDEEN ST	PO/NO.	5068				
	HAWKESBURY, ONT.	WORK LOCATION	HAWKESBURY				
		ACCEPTANCE STD.	ASTM 1417/QSI-038	REV./DATE	2005		
PROJECT	OH 58 FWD/AFT, 206LFWD/AFT, 407 HIGH AFT X TUBES						
ITEM(S) EXAMINED	JOB #S OH 58: 33146,33147,33148,33152,35532,35533,35534,35535. JOB#S 407: 33327						
	JOB #S 206L: 35043,35305,35306.						

JOB DESCRIPTION	PROCEDURE No. LT-0002 REV./DATE	TECHNIQUE No. LT-TECH2 REV./DATE
PART NO. D206667203/D206667103BL/D05876101,201/D407667205	MATERIAL ALODINED ALUM.	THICKNESS
SCOPE WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE		

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LGHT8171	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANTZL67	MINIMUM DWELL TIME	45 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT>100 fc @ SURFACE
PENETRANT REMOVER H2O	MINIMUM DRY TIME	>10 MIN.	OTHER	CAL SEP 18 07	
DEVELOPER SKDS2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE	
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input checked="" type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☒ IMPERIAL)

FLUORESCENT LIQUID PENETRANT INSPECTION
CARRIED OUT ON 100% EXTERNAL SURFACE ON:

206L FWD X TUBES JOB#S 35305
206L AFT X TUBES JOB#S: 35043, 35306
OH58 FWD X TUBES JOB#S: 33146, 33147, 33148, 35532
OH58 AFT X TUBES JOB#S: 33152, 35533, 35534, 35535
407 HIGH AFT TUBE JOB#: 33327

RESULTS: NO INDICATION OF DEFECTS.

ITEMS ACCEPTABLE TO STANDARD:

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner operator and the owner operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE		DTR # E 27347	
TECHNICIAN (SIGNATURE):		REPORT REVIEWED BY:	
NAME (PRINT):	JASON HEWETT	NAME INITIALS	
	1 ST TECHNICIAN	2 ND TECHNICIAN	
CGSB LEVEL	2	CGSB LEVEL	SNT LEVEL
CGSB REG. No	6156	CGSB REG. No	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY